



Which site is least painful during intravenous cannulation?

Cannulation and pain

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Abstract

Aim: The aim was to determine the least painful cannulation site in patients via the Visual Analogue Scale. **Material and Method:** Of 104 patients (53 women) admitted to the Emergency Department of Meram Medical School of Necmettin Erbakan University, 45 were cannulated through antecubital site, 33 by wrists and 26 via dorsal. No difference was detected between groups as to age and gender. All cases were cannulated by the same nurse using pink cannulas. The patients were asked to mark the severity of pain during procedure on the Visual Analogue Scale where scores range from 0 to 10. **Results:** When a significant difference was found between the groups via the Kruskal-Wallis test as to the Visual Analogue Scale scores, the Mann-Whitney-U test with Boferroni correction was performed. Therefore, while the pain on antecubital site was found to be significantly lower during cannulation compared to that found on wrist and dorsal, no difference was found between the pain scores detected on wrist and dorsal. **Discussion:** The antecubital site, a commonly used area for cannulation, was determined to be the least painful area when compared to other sites. It provides easy access to the vein, which may why it is commonly used, and may also be one of the reasons. It is the least painful area during cannulation. In the present study performed in 104 patients, the antecubital area was significantly the least painful cannulation site compared to wrist and dorsal. In patients required to be cannulated, the antecubital site is considered preferable due to painlessness unless specific complications are present.

Keywords

Cannulation; Pain; Intravenous

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Introduction

Peripheral venous cannulation is one of the most frequently used medical modalities in hospitalized patients and among the mainstays of contemporary health care. Cannulation is performed to administer medications into veins, to give fluids to replace the loss of liquid electrolytes, to transfuse blood products, and to conduct parenteral feeding in patients who cannot be orally fed.

Intravenous (IV) catheter insertion is required for different reasons, including giving fluids, blood and blood products, administering some medications, providing total parenteral feeding, hemodynamic follow-up and other procedures that assist diagnosis [1].

For IV cannulation, veins of upper extremities are used most commonly, and among these veins are Vena Basilica and Vena Sefalica. IV intervention is frequently performed through the median basilic and sefalic veins in the antecubital fossa and via the branches passing through the wrists.

Difficulty in venous cannulation may be a challenge for patients and doctors from time to time. According to the results of the Panel for Specialist Anaesthesiologists, the feeling of discomfort felt by patients during IV intervention ranks among the first five challenges patients do not want to encounter [2].

The patient to be intervened may feel anxious and scared, and this anxiety and fear may lead to vasoconstriction by stimulating the sympathetic nervous system. Thus, it is important for health care providers to obtain the most appropriate position for the extremity of the patient, to choose the most accurate site for catheterization, to refer to the patient on the procedure, and to administer the treatment recommended by a specialist if the patient is experiencing pain [3]. In the present study, it was aimed to determine the least painful site during cannulation by means of the Visual Analogue Scale (VAS).

Material and Method

Admitted to the Emergency Department of Meram Medical School of Necmettin Erbakan University, 104 subjects age 18 or over and requiring cannulation according to treatment protocol were included into the single-centered, prospective, and clinical study. Those with a history of oncologic diseases, iron deficiency anemia, conditions developing with thrombocytopenia, thrombocytosis, history of Alzheimer or dementia, and patients who were unconscious were excluded from the study. Also excluded were patients who required multiple attempts for successful cannulation. The study was approved by the local ethics board, and written consent forms were obtained from each patient after each received information about the study design. Our work did not need any additional financial support.

Study Protocol

All participants were intravenously cannulated by the same nurse through antecubital, wrist, and dorsal sites using 20G intracate. The participants were asked to evaluate and mark the pain site felt during IV cannulation on 100mm of horizontal VAS from "no pain" on the left to "pain as bad as it could be" on the right (0, no pain; 10, most severe pain). Then we investigated whether there was a difference in the pain felt in IV cannulation on antecubital, wrist, and dorsal sites between the groups.

Statistical Analysis

Accumulated data were analysed via SPSS 16.0 software package. The data were reported as median (min-max), average, and standard deviation (SD±). Upon obtaining a significant difference for VAS scores between the groups as a result of the Kruskal-Wallis test, the Mann-Whitney-U test with Bonferroni correction was used.

Results

In total, 104 patients were included into the study. The mean age of patients was 47.6 ± 18.5 and 51 (49%) were men. Of 104 patients, 45 (43.3%) were intravenously cannulated through antecubital site, 33 (31.7%) through wrist, and 26 (25.0%) through dorsal site. Demographic distributions of the patients are shown in Table 1 by group. According to VAS scores, the patients exposed to wrist and dorsal IV cannulation felt pain at a significantly higher rate compared to those with IV cannulation through antecubital site ($p < 0.001$, for both) (Table 2, Figure 1).

Table 1. Demographic features of patient groups

	Antecubital (n=45)	Wrist (n=33)	Dorsal (n=26)	p value
Age (years)	43.0 (24.5-58.0)	52.0 (28.5-66.5)	50.0 (37.5-68.0)	0.102
Gender				
Men	24 (53.3)	16 (48.5)	11 (42.3)	0.668
Women	21 (46.7)	17 (51.5)	15 (57.7)	

Table 2. Comparison of VAS scores in patient groups

	Antecubital (n=45)	Wrist (n=33)	Dorsal (n=26)	p value*
VAS scores	3.0 (2.0-4.0)	4.0 (3.5-5.0)	5.0 (3.8-6.0)	<0.001

* $p < 0.001$ for three groups, for antecubital-wrist group, $p < 0.001$; for antecubital-dorsal, $p < 0.001$; and, for dorsal-wrist, $p = 0.313$.

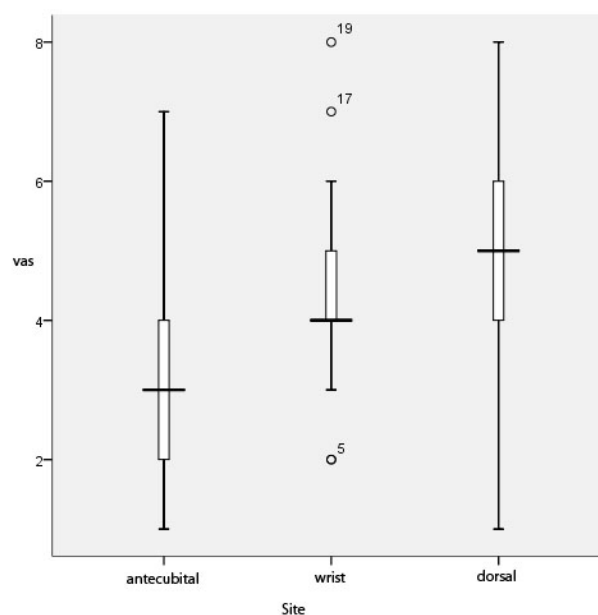


Figure 1. Comparison of VAS scores in patient groups

Discussion

Peripheral IV cannulation is the most frequently performed invasive procedure in emergency settings. Although less painful than many of the other interventions performed in emergency

rooms, IV cannulation is an additional distressing application in patients who have been already under stress. Moreover, for most of the interventions performed in emergency settings, analgesics and, if necessary, sedatives are administered. The standards for professional establishments and accreditation intended to increase the quality of medical care in health organizations report that IV cannulation-induced pain should be decreased [4].

Pain is a subjective finding. In fact, even if the pain felt by different patients is the same, the statements of these patients about their pain may differ. Researchers have long sought a more objective method for evaluating pain. In studies performed, VAS is asserted to be a simple method that can be effectively used in the evaluation of acute and chronic pain [5,6,7]. In a study performed to identify the least painful procedure in IV cannulation, an optimal method was investigated, and the use of local lidocaine was found to decrease the severity of pain in IV cannulation [8].

In another study, IV interventions were determined to lead to pain in patients and to be important in terms of patients' comfort, and it was also determined that such a pain should be decreased [9].

In our study, the least painful site for IV cannulation was investigated, and the difference between the most painful areas was assessed.

Conclusion

Intravenous intervention is among the most frequent treatment modalities in patients admitted to emergency settings in hospitals. Because cannulation is one of the most widespread interventions, decreasing the pain from IV cannulation is very important for patients' comfort and for the satisfaction of patients and their relatives. So, it's critical to choose the best method and to define the most appropriate site. It was concluded in our study that antecubital site used in cannulation is the least painful area and the best option for the procedure.

Ethical Statement

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Scientific Responsibility Statement

The authors declare that they are responsible for the article's scientific content including study design, data collection, analysis and interpretation, writing, some of the main line, or all of the preparation and scientific review of the contents and approval of the final version of the article.

Animal and human rights statement

All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. No animal or human studies were carried out by the authors for this article.

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Conflict of interest

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